Print your own teeth

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What if, instead of waiting days or weeks for a cast to be produced and prosthetic dental implants, false teeth and replacement crowns to be made, your dentist could quickly scan your jaw and "print" your new teeth using a rapid prototyping machine known as a 3D printer?

Researchers in Iran explain how medical imaging coupled with computer-aided design could be used to create a perfect-fit blueprint for prosthetic dentistry, whether to replace diseased or broken teeth and jaw bone. The blueprint can then be fed into a so-called 3D printer to build up an exact replica using a biocompatible composite material. Such technology has been used in medical prosthetics before, but this is an early step into prosthetic dentistry using rapid prototyping.

Writing in the *International Journal of Rapid Manufacturing*, mechanical engineer Hossein Kheirollahi of the Imam Hossein University and colleague Farid Abbaszadeh of the Islamic Azad University, in Tehran, Iran, explain how current technology used to convert an MRI or CT scan into a prosthetic component requires milling technology. This carves out the appropriate solid shape from a block of polymer but has several disadvantages, uppermost being that it is very difficult to carve out a complex shape, such as a tooth. By contrast, rapid prototyping uses a 3D image held in a computer to control a laser that then "cures" powdered or liquid polymer. Almost any solid, porous, or complicated shape can be produced by this 3D-printing technology.

The Iranian team has now demonstrated how rapid prototyping can be used to fabricate dental objects such as implants and crowns quickly and

easily even where features such as overhangs, sharp corners and undercuts are required. The team points out that the most appropriate medical imaging technology, CBCT (cone-beam computed tomography), which is lower cost and exposes the patient to a lower dose of ionizing radiation is best suited to the generation of the computer design for creating such dental objects ready for printing.

More information: "Application of rapid prototyping technology in dentistry" in *Int. J. Rapid Manufacturing*, 2011, 2, 104-120, DOI: 10.1504/IJRAPIDM.2011.040692

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